Remarks/Arguments:

In the Office Action dated March 25, 2004 (hereinafter the "Office Action") a restriction requirement was set forth in which claims 1 - 13 were examined and claims 14 - 29 were withdrawn.

As noted in the Office Action a telephone election of claims 1-13 had previously been made by telephone with traverse. That election is hereby confirmed without traverse.

In the Office Action, claims 1-13 were rejected. Claim 1 has been canceled and replaced with claim 30. Applicants respectfully traverse the rejection of each of the claims now presented for the reasons set forth below.

Rejection Under 35 USC §102

Claim 1, now replaced with claim 30, and Claim 4 were rejected under 35 USC §102(b) as anticipated by Tang et al. (Document #10, hereinafter "Tang")) in light of either Paton, U.S. Patent 6,297,159 (hereinafter Paton '159) or Chen et al. (Document #2), hereinafter "Chen"). This rejection is an improper application of §102. In order for a claim to be anticipated, each and every limitation of the claim must be found (either expressly or inherently) in a single reference. Here, however, the Office Action is applying a combination of references as a basis for an anticipation rejection. Even if the combined references taken together showed each and every feature of the claims, rejection under 35 USC §102 would be improper. Reconsideration and withdrawal of this rejection is requested for this reason.

Assuming, solely for purposes of argument, that the rejection set forth in the Office Action was intended to be a rejection under 35 USC §102 over Tang, or alternatively under §103 over Tang in view of Paton or Chen, the examiner is invited to consider the remarks set forth below.

The Office Action states that Tang discloses a study on increasing yield stress of magnetorheological (MR) fluids comprising applying a magnetic field to the MR fluid then applying pressure to the MR fluid. That is an accurate statement. The Office Action then states that the article discloses at two places that the method is applicable to electrorheological (ER) fluids. Applicants respectfully disagree with this statement and also disagree that Tang discloses applicability to ER fluids as required by 35 USC §112.

Specifically, the abstract states, "The method may also be useful for electrorheological fluids." The underlining is key to understanding the article. According to the author, Dr. R. Tao, that statement was a mere invitation to experiment, as the authors at that time had no idea what conditions were needed to make the method work with ER fluids or if it would work at all. This is further evident from the quote referred to the Office Action from page 2638, which states in part, "If the structure-enhanced yield stress of ER fluids can also be ten times higher than the yield stress without compression, this method will enable ER fluid to have a yield stress exceeding 50 kPa, strong enough for many industrial application." Clearly this is a conditional statement which does not rise to the level required by 35 USC §112 for an anticipation or disclosure of the invention. Equally clearly the authors did not teach or suggest conditions evidencing knowledge of the conditions under which such levels could have been obtained with a reasonable expectation of success. In order for the disclosure to rise to that level, it would be necessary for the article to have disclosed the conditions for operability or which would render those conditions obvious to one skilled in the art. We respectfully submit it does not do this.

Rather, Tang discloses, with respect to MR fluids only, the application of a magnetic field of 372kA/m. How does one skilled in this art equate that and/or derive from that the strength of an electric field which must be applied to and ER fluid to increase yield shear stress to an appropriate level? It is simply impossible to predict from the teaching of this reference, whether taken alone or in combination with either Paton '159 or Chen. The Tang article simply does not suggest or teach the strength of the electric field required for ER fluids, as now reflected in new claim 30.

In addition, Tang clearly teaches at page 2636, just above Fig 3 that 1.2 or 2.0 MPa (mega-pascals), of pressure is required to obtain a 10-fold increase in yield shear stress for an MR fluid. Surprisingly, however, up to a 40-fold increase in yield shear stress is obtained with 50 to 850 kPA as required by present claim 30. Thus, the combination of features now set forth in new claim 30 is neither taught nor suggested by Tang either alone or in combination with Patton '159 or Chen, neither of which applied pressure following application of an electric field to an ER fluid. Nor does Tang teach or suggest the magnitude of enhancement which is obtained or obtainable at such low pressures.

The foregoing comments and principles may be better understood by specific reference to the Tang reference and the present specification and drawings. Tang, as indicated above requires pressures on the order of MPa and the ratio of increase is less than a factor of 10. For

example in Fig. 3 on page 2636, at H=372 kA/m and normal pressure of 2 MPa, the yield shear stress is enhanced 6.7 times over the original yield shear stress without compression. Assuming the principles relating to MR fluids were in fact applicable to ER fluids as suggested in the Office Action, one would expect that ER fluids would require a pressure on the order of MPa and would expect to produce an enhancement in yield shear stress of about 6-7 times the uncompressed value at those pressure levels. However, as shown in Fig 9 of the application, for example at E=2 kV/mm, ER fluids only require 0.08 MPa (80 kPa) to enhance yield sheer stress 6.7 times over an uncompressed ER fluid. That is, only 4% of the pressure required for MR fluids in order to produce a comparable level of enhancement in ER fluids. Clearly that is an unexpected and surprising advantage that could not have been envisioned from the teaching of Tang, alone or in combination with Paton '159 or Chen. For the foregoing reasons, clam 30 and all claims dependent thereon are now believed to be in condition for allowance. Reconsideration and withdrawal of the outstanding rejection is respectfully requested.

Rejection of Claims 2,3 and 7-13 under 35 USC §103(a)

Each of these claims was rejected over Tang in view of Paton '159 or Chen on the stated grounds that the differences between the References and the claims are the limitations set forth in the claims. Applicants respectfully disagree and traverse for the reasons set forth below.

Claims 2 and 3 cover two different orientations through which the yield shear stress of ER fluids may be enhanced through application of a suitable electric field and pressure....pressure applied parallel to the direction of the electric field (claim 2), or perpendicular to the direction of the field (claim 3). We submit it is quite surprising that enhancement of yield shear stress can occur when pressure is applied in any direction relative to the direction of the applied field, as disclosed at page 9, lines 1 - 5 of the specification. This is neither taught nor suggested by Tang or by either Paton '159 or Chen. The fact that the pressure can be provided in any direction relative to the field has now been set forth in new claim 31, and prior claims 2 and 3 have been canceled.

Referring to the Tang reference, the abstract clearly limits the compression step to one "along the direction of the field." The undersigned has been advised by the authors of the Tang reference that the reason for this limitation is that Tang et al. attempted to enhance yield sheer stress of MR fluids by applying pressure perpendicular to the direction of the magnetic field, but were unsuccessful in obtaining any significant enhancement of yield shear stress. With respect

to Paton '159 and Chen, neither of them applied pressure following application of an electric field. Consequently they are irrelevant to the direction in which pressure is applied. Accordingly Tang, alone or in combination with the secondary references does not teach or suggest this feature of the present invention.

Withdrawal of the outstanding rejection is respectfully requested with respect to new claim 31.

Claims 7 - 9 claim the ability to modulate the yield shear stress once it has been established by application of an appropriate electrical field and thereafter exerting an appropriate level of pressure. In the rejection, the Office Action postulates from the statement, "yield stress depends on the applied magnetic field and the compression pressure", that Tang teaches modulation of yield sheer stress in MR fluids. Applicants submit that while modulation of yield shear stress is not impossible in MR fluids, it would be so slow as to be useful only in situations where the modulation could occur over an extended period of time. This is due to the stability of MR fluids once the enhancement has occurred. It takes on the order of several seconds up to minutes for the MR fluid to relax sufficiently to allow for modulation to occur. This concept is referred to generally at page 2636 column 2, 2nd line: "During the experiment, we always gave at least 30 second for the MR fluid to relax after compression."

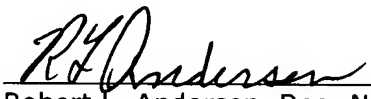
With respect to the present invention, modulation unexpectedly occurs almost instantly, generally within milliseconds, when pressure is changed either upwardly or downwardly or when an appropriate change in electric field is implemented. As a reflection of this difference between MR and ER fluids, claim 7 has been amended to require "promptly modulating" the yield shear stress. It is respectfully submitted that this clearly distinguishes these claims over any modulation which may be effected with respect to MR fluids and thus from the Tang reference. Withdrawal of the rejection with respect to claims 7 - 9 is respectfully requested.

With respect to claims 10 -13, claims 10 and 12 have now been canceled in view of the inclusion of the values for electric field and compression in new claim 30. In the Office action it is alleged that "the subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the reference's (presumably meaning Tang's) teaching because...adjustment of a known effective variable of a known or obvious process is within the capabilities of one skilled in the art." We respectfully submit that the Tang reference provided no guidance as to how to vary the conditions described in that

reference. It did not, alone or with either of Paton '159 or Chen teach of suggest what strength of electric field would be required for ER fluids. Further Tang did not, alone or in combination teach or suggest the dramatic, unexpected increase in yield shear stress such that only 4% of the pressure required for MR fluid was required to produce the same level of enhancement in ER Fluids. The conditions which produce this unexpected advantage are thus critical parameters which are not disclosed in or obvious from the prior art. Accordingly, reconsideration and withdrawal of the rejection is respectfully requested with respect to the claims setting forth these parameters.

In view of the foregoing amendments and remarks, applicants respectfully submit that each of the claims presently presented are novel and unobvious over the art of record and otherwise in condition for allowance. Early notification to that effect is requested. In the event the examiner has additional questions, or comments or would like to discuss the prosecution of this application, examiner is invited to telephone the undersigned to arrange for a telephone or office interview in order to expedite resolution of any issues still outstanding.

Respectfully submitted,



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Dated: June 15, 2004

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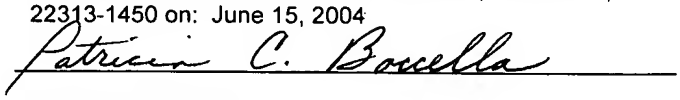

Patricia C. Boccella

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